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EXAMINER	
MILORD, MARCEAU	

ART UNIT	PAPER NUMBER
2682	22

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Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No.	Applicant(s)
	09/691,632	MOLOUDI ET AL.
	Examiner	Art Unit
	Marceau Milord	2682

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1- 12, 20-33, 36-37are rejected under 35 U.S.C. 103(a) as being unpatentable over Rucki et al. (US Patent No 6006112) in view of Welland (US Patent No 6327463 B1).

Regarding claim 1, Rucki et al discloses a transceiver (300 of figs. 3- 4) for transmitting a transmission signal to and receiving a receive signal from an antenna comprising at least one coupling circuit (col. 4, lines 18- 26), each coupling circuit comprising a first node and a second node (302 of figs. 3- 4; col. 4, lines 8- 17); a transmitter (302 of figs. 3- 4) having at least one output to couple the transmission signal to the antenna (305 of figs. 3- 4; col. 1, line 47- col. 2, line 63), each of the at least one transmitter (302 of figs. 3- 4) output coupled to one of the first node of the at least one coupling circuit (col. 4, lines 8- 17); and a receiver (307 of figs. 3- 4) having at least one input responsive to the receive signal from the antenna (305 of figs. 3- 4; col. 4, lines 27- 67).

However, Rucki et al does not specifically disclose a coupling circuit that continuously couples with constant impedance.

On the other hand, Welland, from the same field of endeavor, discloses a method and apparatus for synthesizing high-frequency signals, such as wireless communication signals, which includes a phase-locked loop frequency synthesizer with a variable capacitance voltage controlled oscillator that has a discretely variable capacitance in conjunction with a continuously variable capacitance. The continuously variable capacitance may provide a fine-tuning adjustment of the variable capacitance to focus the output frequency to match precisely the desired frequency output. The variable capacitance circuit may comprise a first capacitor and a second capacitor coupled in series between a first node and a second node, a control node coupled between the first and second capacitors, and a variable resistance coupled between the control node and the second node (col. 3, line 30- col. 4, line 43; col. 6, lines 18- 47; col. 7, line 25-col. 8, line 40; col. 19, lines 7-34; col. 21, lines 1-42). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the technique of Welland to the system of Rucki in order to provide a high-frequency synthesizer that can be fully integrated on single chip.

Regarding claims 2 and 7, Rucki et al as modified discloses a transceiver (300 of figs. 34) wherein the at least one transmitter output is disabled when the at least one receiver input is enabled, and the at least one receiver input is disabled when the at least one transmitter output is enabled (col. 4, lines 42- 67).

Regarding claim 3, Rucki et al as modified discloses a transceiver (300 of figs. 34) wherein the transmitter (302 of figs. 3- 4; col. 4, lines 8- 17) comprises a power amplifier (303 of

figs. 3- 4) comprising the transmitter output (302 of figs. 3- 4), and the receiver (307 of figs. 3- 4) comprises a low noise amplifier (308 of figs. 3- 4) comprising the receiver input (col. 18- 45).

Regarding claims 4 and 23, Rucki et al as modified discloses a transceiver (300 of figs. 34) wherein the at least one transmitter output (302 of figs. 3- 4) and at least one receiver input (307 of figs. 3- 4) comprise a differential line, the transceiver further comprising a matching circuit to interface the differential line to the antenna (see figs. 3- 5), the antenna being single-ended (col. 4, lines 8- 26).

Regarding claims 5- 8, 24- 27, Rucki et al as applied to claims 4-5, 23, 25, 26 differs from claims 5- 8, 24- 27 in that Rucki fails to disclose the feature of a matching circuit comprises a series capacitor and shunt inductor coupled to one of the differential lines, and a series inductor and shunt capacitor coupled to a second one of the differential lines.

However, Welland, from the same field of endeavor, discloses a method and apparatus for synthesizing high-frequency signals, such as wireless communication signals, which includes a phase-locked loop frequency synthesizer with a variable capacitance voltage controlled oscillator that has a discretely variable capacitance in conjunction with a continuously variable capacitance. The continuously variable capacitance may provide a fine-tuning adjustment of the variable capacitance to focus the output frequency to match precisely the desired frequency output. The variable capacitance circuit may comprise a first capacitor and a second capacitor coupled in series between a first node and a second node, a control node coupled between the first and second capacitors, and a variable resistance coupled between the control node and the second node (col. 3, line 30- col. 4, line 43; col. 6, lines 18- 47; col. 7, line 25-col. 8, line 40; col. 19, lines 7-34; col. 21, lines 1-42). Therefore, it would have been obvious to one of ordinary skill

in the art at the time the invention was made to apply the technique of Welland to the system of Rucki in order to provide a high-frequency synthesizer that can be fully integrated on single chip.

Regarding claims 9-12, 28- 31, Rucki as applied to claims 9-12, 23, 28, 30, differs from claims 9-12, 28- 31 in that Rucki fails to disclose the features of one transmitter output comprises a differential transistor pair each having a drain coupled to a different one of the differential lines; and a receiver input comprises a second differential transistor pair each having a gate coupled to a different one of the differential lines.

However, Welland discloses a method and apparatus for synthesizing high-frequency signals, such as wireless communication signals, which includes a phase-locked loop frequency synthesizer with a variable capacitance voltage controlled oscillator that has a discretely variable capacitance in conjunction with a continuously variable capacitance. The continuously variable capacitance may provide a fine-tuning adjustment of the variable capacitance to focus the output frequency to match precisely the desired frequency output. The variable capacitance circuit may comprise a first capacitor and a second capacitor coupled in series between a first node and a second node, a control node coupled between the first and second capacitors, and a variable resistance coupled between the control node and the second node (figs. 1-2; fig. 6; figs. 11-13; col. 3, line 30- col. 4, line 43; col. 6, lines 18- 47; col. 7, line 25-col. 8, line 40; col. 19, lines 7-34; col. 21, lines 1-42). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the technique of Welland to the system of Rucki in order to provide a high-frequency synthesizer that can be fully integrated on single chip

Claims 32-33 contain similar limitations addressed in claim 1, and therefore, are rejected under a similar rationale.

Regarding claim 20, Rucki et al discloses a transceiver (300 of figs. 3- 4; cot. 4, lines 817), comprising: a transmitter (302 of figs. 3- 4) having an output to couple a transmission signal (col. 4, lines 18- 26) to an antenna (305 of figs. 3- 4; cot. 1, line 47- cot. 2, line 63); a receiver (307 of figs. 3- 4) having an input responsive to a receive signal from the antenna (305 of figs. 3- 4; col. 4, lines 14- 32).

However, Rucki et al does not specifically disclose a coupling circuit for continuously coupling, with a substantially constant impedance, the transmitter output to the receiver input; and matching means for matching impedance of the connected transmitter output and receiver input to impedance of the antenna.

On the other hand, Welland, from the same field of endeavor, discloses a method and apparatus for synthesizing high-frequency signals, such as wireless communication signals, which includes a phase-locked loop frequency synthesizer with a variable capacitance voltage controlled oscillator that has a discretely variable capacitance in conjunction with a continuously variable capacitance. The continuously variable capacitance may provide a fine-tuning adjustment of the variable capacitance to focus the output frequency to match precisely the desired frequency output. The variable capacitance circuit may comprise a first capacitor and a second capacitor coupled in series between a first node and a second node, a control node coupled between the first and second capacitors, and a variable resistance coupled between the control node and the second node (col. 3, line 30- col. 4, line 43; col. 6, lines 18- 47; col. 7, line 25-col. 8, line 40; col. 19, lines 7-34; col. 21, lines 1-42). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the technique of

Welland to the system of Rucki in order to provide a high-frequency synthesizer that can be fully integrated on single chip.

Regarding claim 21, Rucki et al as modified discloses a transceiver (300 of figs. 3- 4; col. 4, lines 8- 17) wherein the transmitter (302 of figs. 3- 4) further comprises means (311 of figs. 3- 4 such as Sl- S4; col. 4, lines 34- 41) for disabling the transmitter output (302 of figs. 3- 4) when the receiver input (307 of figs. 3- 4) is responsive to the receive signal from the antenna (305 of fig. 3) and the receiver (307 of figs. 3- 4) further comprises means (311 of figs. 3- 4 such as S4) for disabling the receiver input (col. 4, lines 21- 32) when the transmitter output is coupling the transmission signal to the antenna (col. 4, lines 42- 67).

Regarding claim 22, Rucki et al as modified discloses a transceiver (300 of figs. 3- 4; col. 4, lines 8- 17) wherein the transmitter (302 of figs. 3- 4) includes a power amplifier (303 of figs. 3- 4) having the transmitter output (302 of figs. 3- 4; col. 4, lines 27- 67), and the receiver (307 of figs. 3- 4) comprises a low noise amplifier (308 of figs. 3- 4) comprising the receiver input col. 4, lines 14- 41)

Claims 36-37 contain similar limitations addressed in claim 20, and therefore, are rejected under a similar rationale

Claim Rejections - 35 USC § 103

3. Claims 13-15,19,34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rucki et al. (US Patent No 6006112) in view of Erickson (US Patent No 5054114).

Regarding claim 13, Rucki et al discloses a method of coupling a transceiver (300 of figs. 3- 4) to an antenna (305 of figs. 3- 4), the transceiver (300 of figs. 3- 4; col. 4, lines 8- 17) having a transmitter with a transmitter output (302 of figs. 3- 4) and a receiver input (307 of figs. 3- 4;

col. 4, lines 18- 26); disabling (311 of figs. 3- 4 such as S4) the receiver input by powering off at least a portion of the receiver; transmitting a transmission signal from the transmitter output (302 of figs. 3- 4) to the antenna (305 of figs. 3- 4) with the receiver disabled (311 of figs. 3- 4 such as S4 ; col. 4, lines 21- 32;311 of figs. 3- 4 such as S1- S4; col. 4, lines 34- 41;col. 4, lines 42-67).

However, Rucki et al does not specifically disclose the feature of a method comprising continuously coupling, with a substantially constant impedance, the transmitter output to the receiver input; and the steps of disabling the transmitter by powering off at least a portion of the transmitter and enabling the receiver by powering on at least a portion of the receiver; and receiving a receive signal from the antenna at the receiver with the transmitter disabled

On the other hand, Erickson, from the same field of endeavor, discloses an input port of the broadband impedance matching means that is connected to the output of the transmitter; a means for providing receiver isolation during receive has an input port connected to the common signal path and an output port to an input of the receiver (col. 1, lines 43-64). This circuit provides a broadband impedance match to the transmitter by using a bandpass filter designated specifically for impedance matching, enabling operation over the desired band (col. 2, lines 57-66). RF circuit 24 maintains relatively constant impedance matching (col. 3, lines 45-67; col. 4, lines 39-51). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the technique of Erickson to the system of Rucki in order to provide a very good impedance match between the transmitter and the antenna, and maintain relatively constant impedance.

Regarding claim 14, Rucki et al as modified discloses a transceiver (300 of figs. 34) wherein the transmitter (302 of figs. 3- 4; col. 4, lines 8- 17) comprises a power amplifier (303 of figs. 3- 4) comprising the transmitter output (302 of figs. 3- 4), and the receiver (307 of figs. 3- 4) comprises a low noise amplifier (308 of figs. 3- 4) comprising the receiver input (col. 18- 45).

Regarding claim 15 Rucki et al as modified discloses a transceiver (300 of figs. 34) wherein the at least one transmitter output (302 of figs. 3- 4) and at least one receiver input (307 of figs. 3- 4) comprise a differential line, the transceiver further comprising a matching circuit to interface the differential line to the antenna (see figs. 3- 5), the antenna being single-ended (col. 4, lines 8- 26).

Claims 34-35 contain similar limitations addressed in claim 13, and therefore, are rejected under a similar rationale.

Claim19 contains similar limitations addressed in claim 13 and therefore, is rejected under a similar rationale.

2. Claims 16 -18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rucki et al. (US Patent No 6006112) in view of Erickson (US Patent No 5054114) as applied to claims 13-15 above, and further in view of Lampen (US Patent No 5375257).

Regarding claims 16, 17 and 18, Rucki and Erickson disclose everything claimed above except the features of shifting a first signal on one of the differential lines by 90 degrees, shifting a second signal on a second one of the differential lines by 90 degrees in an opposite direction, and combining the shifted first and second signals.

However, such a technique is common as shown by Lampen in figure 2 where a transmitted signal from the transmitter 18 is fed, via port 1004, to the port 28, of the coupler 28

wherein a portion of the transmitted signal is fed to the phase shifter 102 and another portion of the transmitted is fed to the phase shifter 108. The phase of the signal at the input of the phase shifter 108 lags the phase of the signal at the input of the phase shifter 102 by 90 degrees (figs. 1-2; col. 6, line 24- col. 7, line 47; col. 9, line 26- col. 10, line 35). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the phase shifters used in Lampen to the modified system of Erickson and Rucki in order to shift the first signal by 90 degrees and match the connected transmitter output and receiver input to the antenna.

Response to Arguments

5. Applicant's arguments with respect to claims 1-37 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marceau Milord whose telephone number is 703-306-3023. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian C. Chin can be reached on 703-308-6739. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

M Milord

MARCEAU MILORD

Marceau Milord

Examiner

Art Unit 2682

3/4/04